from Australia:—Contributions to the Flora of New Guinea; Contributions to the Flora of Queensland (Fungi); and Edible Fruits indigenous to Queensland; all by F. M. Bailey.

AN elaborate illustrated catalogue of chemical and physical apparatus has been issued by Messrs. Reynolds and Branson, Ltd., Leeds. No less than three thousand separate pieces of apparatus are numbered in the catalogue, and very many of them are illustrated. The large number of physical appliances and instruments included in the catalogue is an indication of the important part which instruction in physics now takes in science schools. Teachers of practical science, more especially those working in connection with the Department of Science and Art, will find the catalogue serviceable when considering the purchase of apparatus.

M. C. SCHUYTEN publishes in the *Bulletin* of the Belgian Academy a continuation of his researches on the double salicylates of certain metals and antipyrin. He now finds that the salicylates of magnesium, of manganese and of lead, as well as certain others previously investigated, give rise to compounds with antipyrin, while he has found it impossible to realise, under the same conditions, the formation of double salicylates of aluminium, of chromium, and of uranium and antipyrin. The case of bismuth is reserved for future consideration. M. Schuyten calls attention to the instability of these compounds in which water easily promotes dissociation.

THE additions to the Zoological Society's Gardens during the past week include a Sooty Mangabey (*Cercocebus fuliginosus*, ♀) from West Africa, presented by Mrs. Henry Lloyd; a Mozambique Monkey (*Cercopithecus pygerythrus*) from East Africa, presented by Mrs. Snowden; an Indian Wild Dog (*Cyon aukhunensis*, ♂) from India, presented by Surgeon-Lieut.-Colonel J. Duke; an Egyptian Jerboa (*Dipus ægyptius*) from North Africa, presented by Mr. David Devant; a Suricate (*Suricata tetradactyla*) from South Africa, presented by Mrs. Molteno; a Golden Eagle (*Aquila chrysætus*), British, presented by the Rev. F. Foxhambert; a Black-headed Caique (*Caica melanocephala*) from Demerara, presented by Master Bertie Standing; a Common Squirrel (*Sciurus vulgaris*) from Austria, presented by Mr. A. M. Wigram; a Puma (*Felis concolor*) from America, a Reticulated Python (*Python reticulatus*) from the East Indies, deposited.

OUR ASTRONOMICAL COLUMN.

VARIABLE STARS IN CLUSTERS.—American astronomers have, during the last few years, made great advance in increasing our knowledge relating to variable stars. Nor have they limited themselves to photographic surveys of variable stars of the ordinary type, but have been examining clusters of stars to detect variability. Prof. Bailey, who has been very successful in this direction, has just undertaken a systematic search which has led him to some most interesting results (*Harvard College Observatory Circular*, No. 33). This *Circular* informs us that the whole number of stars examined in the photographs was 19,050, of which 500 were found to be variable, thus representing a variability of about 3 per cent. This at first does not seem a very high percentage, but, as Prof. Pickering points out, "it does not follow, however, that clusters in general contain more variable stars than occur elsewhere, for, if we except the four clusters ω Centauri, Messier 3, Messier 5, and Messier 15, which contain 393 variables, an average of 7 per cent., the remaining 19 clusters have 116 variables among 13,350 stars, or less than 1 per cent." Even clusters which are equally rich in stars show great differences in this respect: thus the great cluster in Hercules (Messier 13) has only two variables out of 1000 stars, while in Messier 3, of 900 stars, 132 are variable. Not only have variables in these clusters been detected, but their periods and light curves are being carefully determined. In the case of the cluster ω Centauri, which up to the present has received most attention, 150 photographs have been taken with the 13-inch, and already 10,000 measures have been made. Of the 3000 stars used in this cluster for comparison, 125 have been recorded as variable. The periods of 106 have been determined, and 98 of these have periods less than 24 hours, the largest range in variation being about 5 magnitudes; no star is included which varies less than half a magnitude. Prof. Pickering has divided these 98 variables into four classes, namely, those which have a very rapid rise to maximum, those like η Aquilæ with a secondary maximum, those whose times of increase and decrease are about equal, and lastly those which drop very suddenly from maximum to minimum: attention is called also to the marked regularity in the periods. In referring to the kind of clusters in which variables have been detected, he says that up to the present time only such dense globular clusters as Messier 3, Messier 5, and the great cluster in Hercules have been found to contain them.

LARGE METEORS IN 1897 AND 1898.—Mr. W. F. Denning in the *Observatory* for the present month brings together a number of notes concerning fireballs and bright meteors which have been observed in England during the last year and a half. In many cases sufficient and accurate information was available to enable their real paths to be determined. The radiant-points which have been derived from these observations are in most cases, as he says, very interesting, as they suggest evidence of new showers or corroboration of others previously observed.

As we have on several occasions in this column pointed out the great necessity of obtaining accurate and complete information of the path of these roving bodies through our atmosphere, so that observations may be comparable with one another, it is encouraging to read, and Mr. Denning himself is the writer, that "it is clear . . . that this department is receiving more attention than formerly. It is hoped that this interest will continue to increase, and that the fortunate spectators of fireballs will never forget to record those all-important features, viz. the direction and position of the flight amongst the stars and the duration of visibility."

REMINISCENCES OF AN ASTRONOMER.—Prof. Simon Newcomb continues in *The Atlantic Monthly* for September his reminiscences, from which we make the following few extracts. In one of his journeys to observe a total eclipse of the sun he went to Gibraltar, and one of the first things he did the morning after his arrival was to choose "a convenient point on one of the stone parapets for 'taking the sun,' in order to test the running of my chronometer. I had some suspicion as to the result, but was willing to be amused. A sentinel speedily informed me that no sights were allowed to be taken on the fortification. I told him I was taking sights on the sun, not on the fortification. But he was inexorable; the rule was that no sights of any sort could be taken without a permit." Needless to say Prof. Newcomb soon obtained the required permit, and was allowed to continue his sights without interruption.

Having some important work to do with regard to the motion of the moon, and the Franco-Prussian war being on at the time, Prof. Newcomb went to Berlin, *viâ* Naples to pass the winter, and to wait till the war was over, until he could visit Paris. Having arranged his luggage so that on landing at Naples the Custom House officer should find anything that was subject to duty at the top of his trunk, the officer contemptuously threw the top things aside, and devoted himself to a search at the bottom. "The only unusual object he stumbled upon was a spy-glass enclosed in a shield of morocco. Perhaps a gesture or a remark on my side aroused his suspicions. He opened the glass, tried to take it to pieces, inspected it inside and out, and was so disgusted with his failure to find anything contraband in it that he returned everything to the trunk, and let us off."

Speaking of Prof. Auwers, who "stands at the head of German astronomy," he says, "in him is seen the highest type of the scientific investigator of our time, one perhaps better developed in Germany than in any other country. The work of men of this type is marked by minute and careful research, untiring industry in the accumulation of facts, caution in propounding new theories or explanations, and, above all, the absence of effort to gain recognition by being the first to make a discovery." Journeying to Pulkova to visit Otto Struve, Prof. Newcomb relates many interesting reminiscences. After mentioning that

© 1898 Nature Publishing Group

the instruments which Struve designed sixty years ago still do the finest work of any in the world, he tells us that the air there "is remarkably clear; the entrance to St. Petersburg, ten or twelve miles north, is distinctly visible; and Struve told me that during the Crimean war he could see, through the great telescope, the men on the decks of the British ships besieging Kronstradt, thirty miles away." Towards the latter part of these reminiscences, Prof. Newcomb mentions his meeting with Hansen, "who was at odds with him on a scientific question," the question being that Hansen was the author of a theory that the further side of the moon is composed of denser materials than the side turned towards us. We must, however, leave our readers here to study this article for themselves for further details, as we have already extended this note beyond the usual limit.

THE CAPE OBSERVATORY REPORT.—Dr. Gill's report to the Secretary of the Admiralty of the work done at the Cape Observatory during the year 1897, shows the great state of activity which has pervaded the whole atmosphere of the observatory during the past twelve months. It will be remembered that Mr. McClean last year made a stay at the Cape to complete his spectroscopic survey of all stars down to 3·5 magnitude, his 20-degree prism being fitted on to the 12-inch astrophotographic telescope. Unfortunately Mr. McClean's magnificent gift to the observatory did not arrive from Dublin during his stay, as was expected, so that he was deprived of the pleasure of witnessing its erection. The observatory for this instrument is completed as far as possible, and is only now waiting for the arrival of the heavy portions of the telescope. The rising floor and its hydraulic machinery have been set up, and, as Dr. Gill says, "the whole has been admirably designed by Mr. McClean and Mr. Osbert Chadwick, . . . it was erected here under my personal supervision by Cape workmen, and acts to perfection." The plans for the new transit circle and observatory have been settled in complete detail, and both will be executed with as little delay as possible. The transit circle has been employed chiefly for observations of standard stars required for the reduction of measures of the Catalogue photographic plates. A system of double watches with this instrument was organised so that the observers would be ready to take up the fundamental meridian work with the new transit circle in 1900. Both the equatorials have been employed, and the 7-inch was chiefly used by Mr. Innes for observing the stars in four lists forwarded by Prof. J. C. Kapteyn. In this work a star of the eighth magnitude was discovered "having an annual proper motion amounting to nearly 9″ of arc on the great circle, *the largest proper motion yet known.*" Besides several uncatalogued nebulæ, Mr. Innes has found no less than 128 new double stars. Many of our readers may not be aware that Mr. Innes is secretary, librarian, and accountant to the establishment, but "has applied himself to the revision of the Durchmusterung and other extra-meridian work (which he has performed as a labour of love), in addition to the thorough discharge of his official clerical duties." To refer to the work accomplished and proposed for the heliometer, the observations of the zenith telescope, the state of current reductions, publications, time service, would make this note too long, so we will only confine ourselves, in conclusion, to the fact that proposals have been sent forward for erecting a suitable building for a physical laboratory and accommodation for records and astrographic work.

ZOOLOGY AT THE BRITISH ASSOCIATION.

ALTHOUGH the foreign zoologists who had attended the International Congress at Cambridge a week before did not stay on for the British Association meeting, as had been expected, still the attendance at Section D was good, and many of the papers were of an interesting character. The number of papers was not large, so the Section did not meet on Saturday and Wednesday.

Prof. Weldon's presidential address gave a useful popular discussion of some of the principal objections which are urged against the theory of Natural Selection, and showed (1) that the law of chance enables one to express easily the frequency of variations among animals; (2) that the action of Natural Selection upon such fortuitous variations can be experimentally measured; and (3) that the process of evolution is sometimes so rapid that it can be observed in the space of a few years.

The Section did not sit in the afternoon, but a Biological Exhibition at the Clifton Zoological Gardens was opened at three o'clock by Sir John Lubbock.

Friday, September 9.—The following papers were taken:—Prof. E. B. Poulton, on the proof obtained by Marshall that *Precis octavia-natalensis* and *P. sesamus* are seasonal forms of the same species. The specimens were exhibited.

Mr. F. Galton, on photographic records of pedigree stock. This was for the purpose of urging the systematic collection of photographs and information as to pedigree stock. Galton's ancestral law proves the importance of a much more comprehensive system of records than now exists. A breeder ought to be in a position to compare the records of all the near ancestry of the animals he proposes to mate together in respect to the qualities in which he is interested. More especially he ought to have access to photographs, which indicate form and general attitude far more vividly than verbal descriptions. Mr. Galton considers that every important stallion or bull should have a pamphlet all to himself, with photographs of his ancestry and with appropriate particulars about each of them. Mr. Galton, finally, proposes a scheme for the consideration of societies which publish stud books.

Mr. W. Garstang, on the races and migrations of the mackerel. From the examination of a large number of mackerel Mr. Garstang is able to distinguish the following three races:—(1) American, (2) Irish or Atlantic, and (3) North Sea and Channel. Each of these races, he considers, does not wander far from its own coast in winter, and does not mix with the other races, but merely moves out into deeper water. Mr. Garstang also gave, along with Mr. H. N. Dickson, an account of the connection between the appearance of mackerel and the changes of sea temperature in spring and autumn. Whether the movements of the mackerel are determined directly by the temperature or indirectly through food was left unsettled; but the authors proposed a more detailed biological and physical investigation of the English Channel.

Prof. A. B. Macallum gave a short paper calling attention to points in the microchemistry of cells. A report was presented by the Committee on Zoological Bibliography and Publication, and also one by the Index Animalium Committee, giving an account of Mr. Sherborn's work at the Natural History Museum. The Canadian Biological Station Committee, appointed last year at Toronto, reported in favour of a floating station to be established in the Gulf of St. Lawrence for five years. Their application to the Dominion Government for an appropriation for construction and maintenance has been granted.

The report from the Plymouth Marine Biological Laboratory contained an account by Mr. G. Brebner of his algological work, by Mr. F. W. Gamble on his investigation of the nerves of Arenicola, Nereis, and other Polychæts by the methylene blue method; and by Prof. Hickson on the embryos of Alcyonium collected by Mr. Wadsworth.

The Committee on the Zoology of the Sandwich Islands stated that work was in progress, and that they hope to be able soon, with the aid of the Royal Society and the Bishop Museum in Honolulu, to publish a volume of investigations.

Dr. Arthur Willey's paper "On the phylogeny of the Arthropod amnion" stated that the importance of the problem lies in the fact that the principle which will account for the amnion of insect embryos is the same as that which has been applied by Prof. Hubrecht to the mammalian amnion. The insect amnion is not cenogenetic and is not due to mechanical causes, as is the prevailing impression, but it is of palingenetic significance. The material which supplied the necessary data for coping with this problem consisted of the embryos of a species of *Peripatus* (*P. novæ britanniæ*) which Dr. Willey found in New Britain last year. These embryos possess a remarkable trophic organ, the epidermal layer of which is called the trophoblast, and the latter is the forerunner of the serosa of insect embryos—the serosa being the essential structure in connection with the embryonic membranes of insects, the amnion being accessory or incidental to the serosa.

The report from the Naples Zoological Station, in addition to the usual statistical information as to the progress of the station, contained accounts by the three naturalists who have occupied the British Association table during the year as to their special work. Mr. J. F. Gemmill investigated the pseudobranch and the intestinal canal of Teleosteans. Mr. H. M. Vernon writes on the relations between marine animal and vegetable life in aquaria; and on the relations between the hybrid and parent

© 1898 Nature Publishing Group